



Telescope Time Allocation for the VLA and VLBA

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The process in brief for regular/triggered/large proposals

1. Call for proposals goes out about a month before proposal deadline
 - Proposal deadlines ~Feb 1 and ~Aug 1
 - Next deadline Feb 1, 2021 for Semester 21B (B-config).
2. Astronomer submits a proposal
3. Proposal gets reviewed
4. Time allocation committee (TAC) meets
5. Disposition letter go out about 2.5 months before next proposal deadline.
6. For the VLA, proposers receive a “readiness letter” about a month before configuration for which they have been granted time begins
7. Proposer(s) prepare observing schedule
8. (Most) Observations get scheduled dynamically

What I am skipping

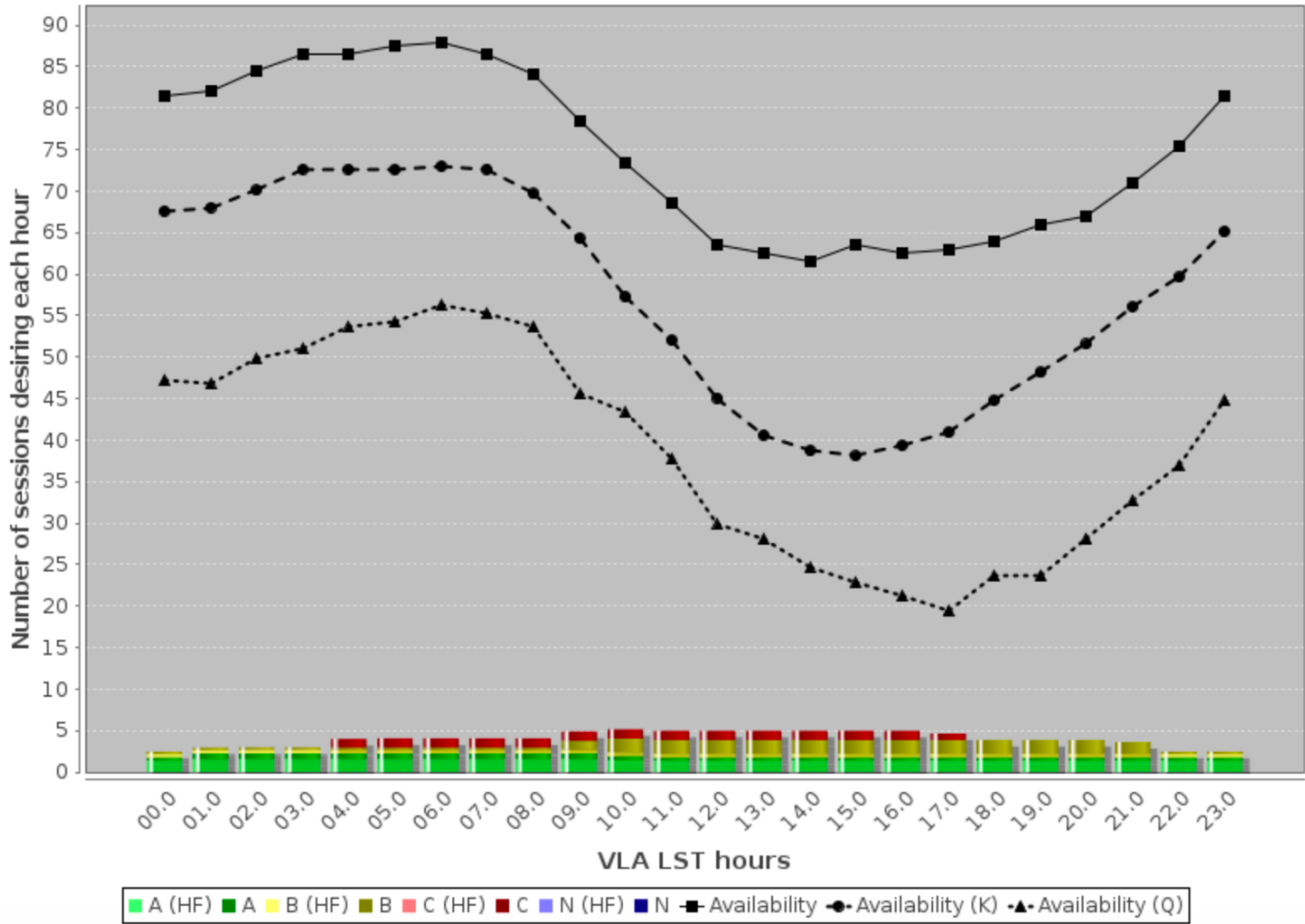
- DDT proposals
 - These can be submitted anytime and are reviewed in-house
 - Target of opportunity or exploratory
 - Usually request only a few hours of time
 - Response is a few days to a week
- GBT proposals
 - The NRAO/GBO call for proposals includes the Green Bank Observatory and those proposals go through the same review process as VLA and VLBA proposals
- GMVA (Global Millimeter VLBI Array) proposals
 - The NRAO/GBO call for proposals also includes the GMVA which are ranked and reviewed with the other proposals but they are not granted time by the NRAO Time Allocation Committee (TAC) because they involve many non-NRAO telescopes.
- ALMA proposals
 - A completely different proposal and review process.

I. NRAO releases call for proposals

About a month before the proposal deadline

Scheduling Priority
21B / B Configuration / Priority

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2. Astronomer submits a proposal

- Proposal is submitted to one of nine Science Review Panels (SRP)

SSP - **S**olar system, **S**tars, **P**lanetary systems: Sun, planets, comets, IPM, exoplanets, main sequence stars, active stars, stellar winds, AGB stars, post-AGB stars, PNe, novae

GWT - **G**ravitational **W**aves and **E**nergetic **T**ransients: Supernovae, gravitational wave sources, gamma-ray bursts, tidal disruption events, fast radio bursts, exotic/unknown transients

PCO - **P**ulsars and **C**ompact **O**bjects: Millisecond pulsars, cataclysmic variables, black hole and/or neutron star x-ray binaries, pulsar timing, pulsar proper motion

SFM - **S**tar **F**or**M**ation: young stellar objects, protostars, jets, outflows, T Tauri stars, circumstellar disks, protoplanetary systems

ISM - **I**nter**S**tellar **M**edium: galactic HI, OH, ISM magnetic fields, SNRs, HII regions, astrochemistry

NGA - **N**ormal **G**alaxies: galaxies (continuum), groups, clusters: disk emission, star formation, magnetic fields, galactic winds, starbursts, intracluster emission

EGS - **E**xtra**G**alactic **S**tructure: galaxies (line), galaxy structure, galaxy kinematics and dynamics, galaxy chemistry, gas in galaxies

AGN - **A**ctive **G**alactic **N**uclei: Seyferts, low-luminosity AGN, water megamasers, radio galaxies, blazars, quasars/QSOs, environmental interactions

HIZ - **H**igh-**Z**: high-z objects, extragalactic source surveys, galaxy formation, gravitational lenses, CMB, early universe

2. Astronomer submits a proposal

- Note for students: Students can submit proposals the semester before their proposed VLA configuration deadline simply to receive comments from the SRP in order to improve their proposal.
- Proposal is submitted to one of the nine Science Review Panels (SRP), the panels are designed to review between 30-50 proposals, however we have received up to 90 proposals to a panel.
- Each SRP is made up of 6 members, a chair and 5 panelists
 - The chairs of each panel make up the membership of the Time Allocation Committee (TAC)
- You can volunteer to be on a SRP by going to:
 - <https://www.aoc.nrao.edu/~mclausse/newex.html>

2. Astronomer submits a proposal II

- Multi-configuration or multi-semester proposals
 - Proposers are allowed to ask for multiple VLA configurations or semesters if the proposed science requires it.
 - For the VLA one of the configurations requested **must** be include the configuration(s) in offered for the semester.
 - VLA proposals can ask for **Any** configuration, if the configuration is not important
 - VLBA example: most astrometry proposals on the ask for multiple semesters
- Two types of joint proposals.
 - Internal NRAO/GBO. You may submit proposals that request multiple telescopes in the call for proposals. E.g., the VLA and the GBT. For this you must submit a proposal to each telescope with the identical scientific justifications.
 - External space telescopes. You may request HST, Fermi, Chandra, Swift or XMM time along in your NRAO/GBO proposal. This time is limited and granted by the NRAO TAC.
- Note that High Sensitivity Array (HSA) proposals are **NOT** joint proposals. The HSA is the VLBA plus one or more of the VLA, GBT, and/or Effelsberg (EB) in a VLBI array.

3. Proposal is reviewed

- For technical and scheduling feasibility by NRAO staff
- Scientifically by the SRP:
 1. Each proposal receives individual reviews from panel members
 2. The panels meet via telecon and discuss each proposal
 3. The output of the SRP is a rank ordered list of all the proposals that are submitted to that SRP and consensus review of each proposal
 4. The proposals in the ranked list are given a "linearized" score from 0 (best) to 10 (worst) and combined with the proposals from the other SRP.
 5. Then the VLBA and VLA schedulers give the proposals **preliminary** priorities
 - For the VLBA scores from 0 to 2.5 are given A; 2.51 to 5 are given B; 5.01 to 7.5 are given C; and 7.51 to 10 are given N (rejected)
 - For the VLA the scores are fed into the VLA prioritizer

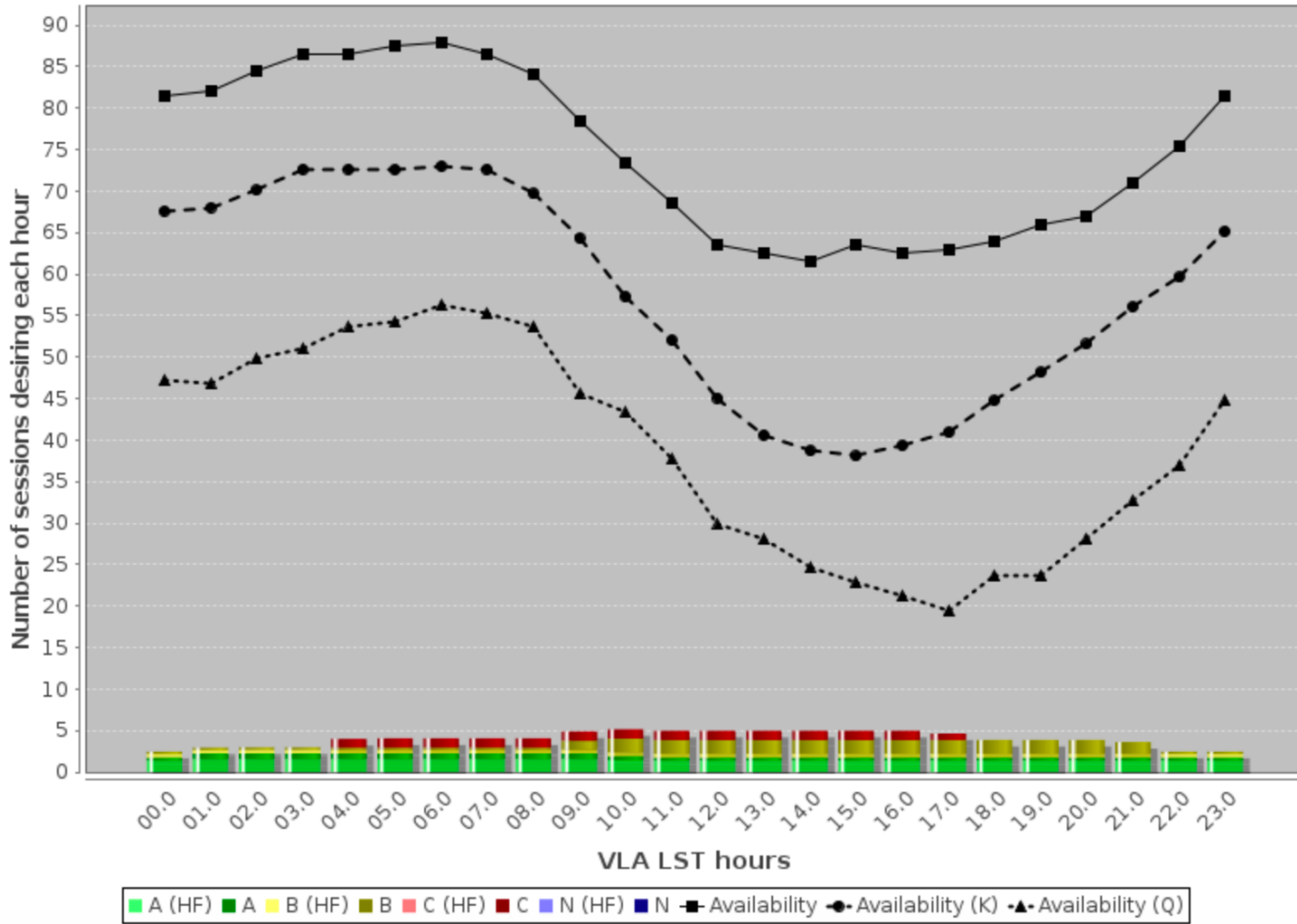
Priorities and Caveats

- A-priority: top ranked, will most certainly get done
 - A-priority that does not get done in a semester/configuration can be carried over to the next semester/configuration
- B-priority: will get observed on a best effort basis
 - usually observe >90% of B-priority projects
- C-priority: filler
 - Usually observe between 50%-70% of filler
- Caveats:
 - The preliminary priorities supplied to the TAC are a starting point and can and are changed by the TAC.
 - Triggered proposals are not assigned a priority before the meeting, because the required response time is very important for the success of the scientific program.

VLA Prioritizer

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Scheduling Priority
21B / B Configuration / Priority



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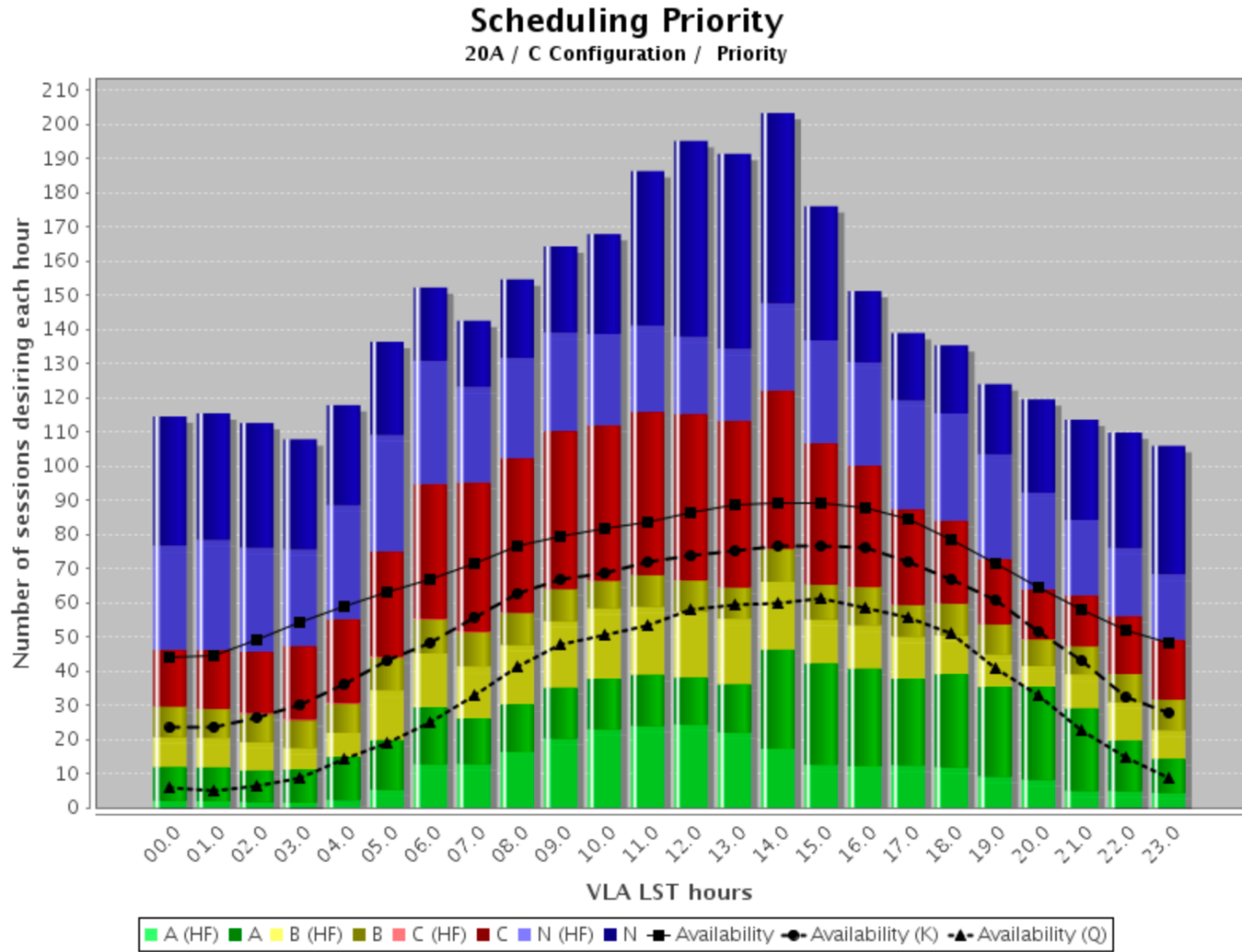
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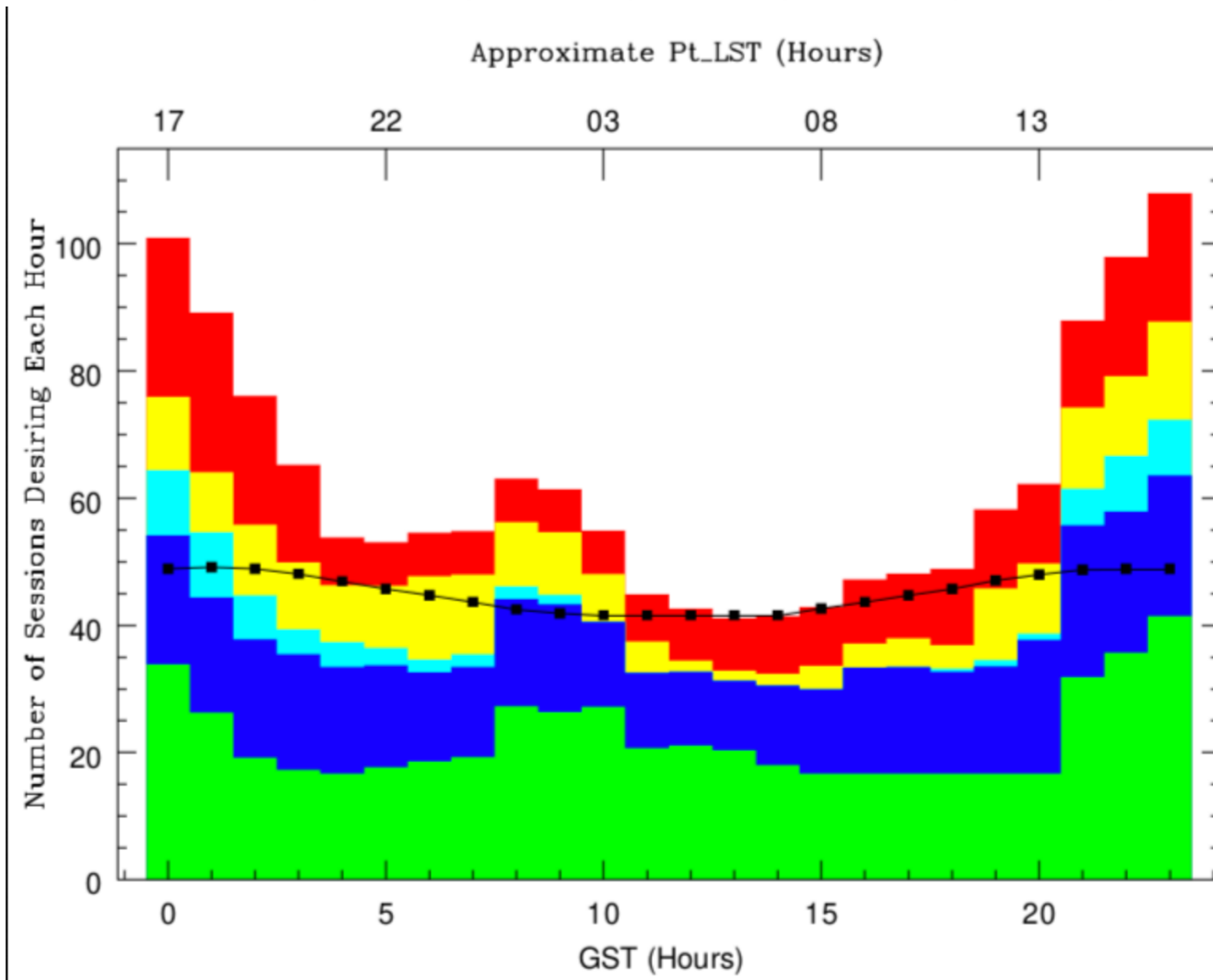
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VLA pressure plot from TAC Report



VLBA pressure plot from TAC Report

Pre-committed A-priority B-priority C-priority Rejected



4. TAC meets

- TAC has 9 members and consists of the chairs from each SRP
- Every proposal is discussed and the priority from those suggested by the schedulers of each telescope can be modified.
- Also considers joint telescope requests internal and external.
 - For both types of joint proposals the TAC considers whether both telescopes are actually required for the scientific goals of the proposal.
- Grants future configurations/semesters if justified and the priority high enough. C-priority projects are unlikely to be granted future configurations/semesters.

4. TAC meets II

- Triggered proposals are handled separately since their trigger criteria are an important consideration. Generally, if required response time is:
 - < 4 days then proposal needs A priority
 - ~week then proposal needs at least B-priority
 - more than a week then proposal can succeed with C priority
 - If a proposal does not have a score good enough to obtain the priority required by the response time then the proposal is rejected. A note is added to the disposition letter stating it was rejected for this reason.
 - For example, a triggered proposal that requires a 1 day response and a score of 4.5 would be rejected.
- Similar to Triggered proposals, proposals the required fixed-date scheduling (e.g. HSA or coordinated observations) or a strict cadence must have a score appropriate for the required scheduling.

5. Disposition letters go out

- Go out ~2.5 months before the next deadline
- Contain:
 - Number of hours granted and priority
 - Comments from the TAC, consensus review of SRP, and technical review.
- TAC report is also published at this time and contains the pressure plots for the semester for the VLBA or VLA configuration(s) available in the semester

6. For VLA readiness letters go out

- Go out about a month before the the start of configuration for which time has been granted.

7. Astronomer prepares for observing

- For both telescopes it is to the observers best interest to submit schedules **before the start of the semester/configuration**
- VLBA – use Sched to produce schedule and e-mail to vlbiobs@nrao.edu
- VLA – prepare scheduling block (SB) in the web-based Observation Preparation Tool (OPT) and submit when completed.
- If you need help submit a helpdesk ticket (<https://help.nrao.edu/>) to the VLA or VLBA scheduling support department.
- If you want/need to make a change in from what is requested in the approved proposal, you must send an request to schedsoc@nrao.edu detailing the reasons for the change and asking permission to do so.

7. Astronomer prepares for observing II

- Submitted schedules will be examined by the data analysts for both telescopes and approved/put in the queue for those telescopes.
 - Note that the analysts will only examine the schedule for technical correctness not scientific correctness. For example, they will not check if you have chosen the best phase calibrator or if your frequency setup covers the spectral lines you wanted to observe.
 - If you are a novice, we suggest you request more thorough examination of your schedule through the helpdesk (<https://help.nrao.edu/>).

7. Astronomer prepares for observing III

- Both telescopes have weather and other observing constraints that must be selected by the observer.
 - These include weather, date range constraints and on the VLBA what antennas are required for the observations.
 - These requirements can limit the ability of project to be observed in a timely manner but can be essential. Just make sure what you declare is required really is required.
 - VLBA example: Your schedule requires 10 telescopes on the VLBA, but the VLBA Saint Croix (SC) telescope is damaged by a hurricane and is out for a several months for repairs, while SC is out the schedule will not be observed no matter what the priority or score.
 - VLA example: You are observing at 22GHz, and check the "avoid sunrise" button for your SB in the OPT because it seems like a good idea (hint: it is not) for the entirety of the configuration your SB has an LST range that would cross sunrise so the SB will never be selected not matter the priority or score.

8a. VLA Observation Scheduling Tool (OST)

- The VLA Operator asks the OST to make a schedule for a certain length of time, typically ~24 hours.
- The OST then picks scheduling blocks (SB) to run based on priority, current weather, predicted weather, length of SB and science score.
 - There is a complicated formula, but note that weather and priority supersedes everything else.
 - Tries to fill up the 24 hours with most efficient schedule given weather and priority constraints.
 - Presents the operator with a set of ranked options of what to run first, the operator usually picks the top one.
- Near the end of the SB currently being observed, because the weather can change, the operator starts with step 1 again.
- Once the observation is complete the observer gets an e-mailed log.
- If an SB is failed during the observation then the observer will not get a log, but the observation will appear in the archive. Submit a helpdesk ticket if you don't understand what is in the archive.

8b. VLBA Dynamic Scheduling

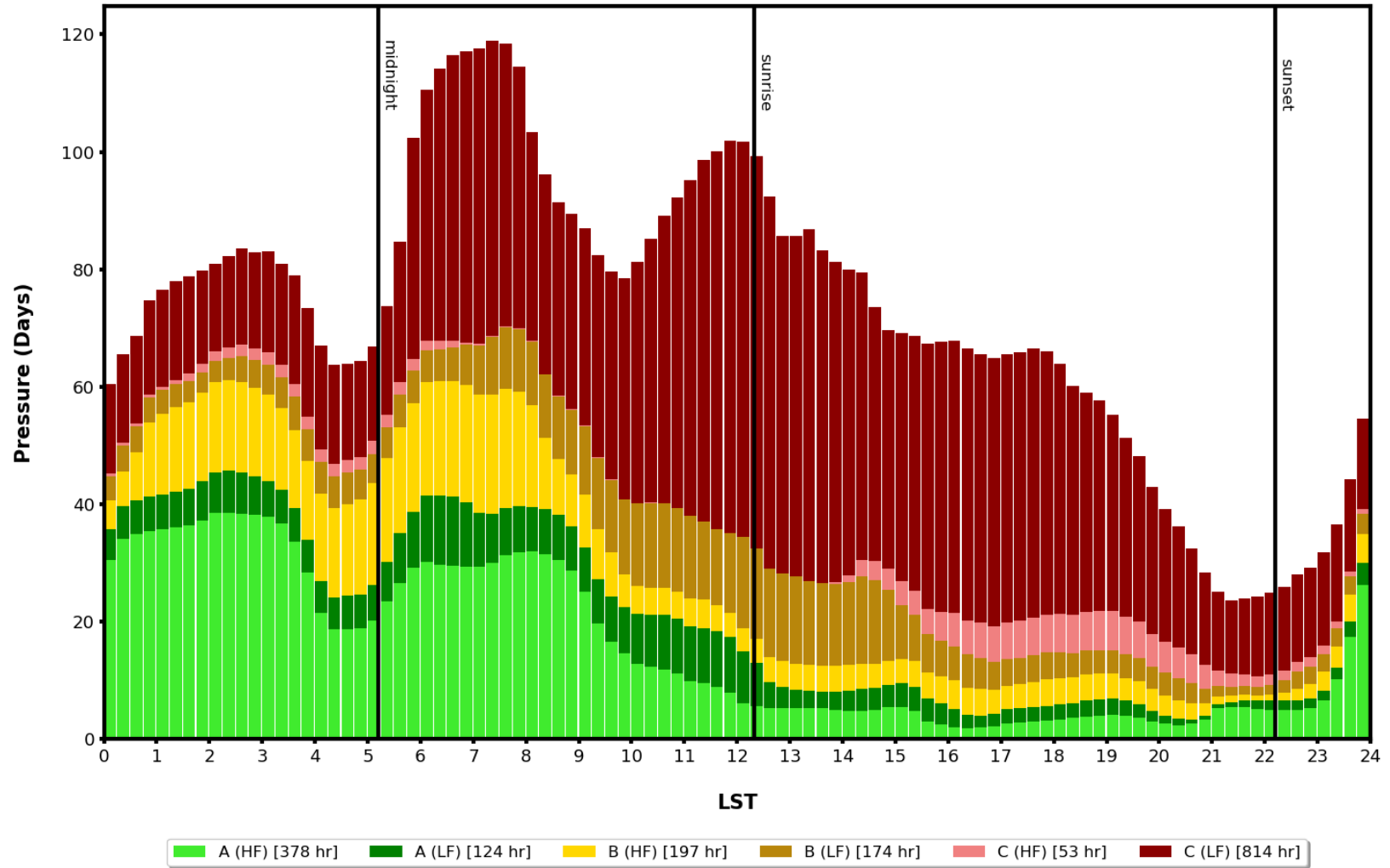
- One or two days in advance the VLBA dynamic scheduler (a human) looks at the weather at the diverse VLBA sites.
- Based on the weather, the available telescopes and the priority and SRP score observing schedules are selected to fill the schedule.
- Observer gets an e-mail log once the observation is completed
- About 2 weeks after execution, the observation is correlated and the observer gets an e-mail saying the observation has been correlated and the data can be downloaded.

Considerations for getting on the telescope quicker

- Get your schedules in before the start of the semester/configuration!!!!!!
- Check the pressure plots available in the TAC report for the VLBA and the weekly updated on-line pressure plot for the VLA. You can increase the likelihood of observation by:
 - Shifting time range of observation so you can avoid high pressure LST/GST ranges
 - Shifting observation to nighttime for high frequency observations

Considerations for getting on the telescope

LST Pressure for 2020-12-11
Configurations = A, Any



Resources

- Helpdesk – <https://help.nrao.edu/>
- Call for Proposals – <https://science.nrao.edu/observing/call-for-proposals>
- Guide to proposing
 - VLA – <https://science.nrao.edu/facilities/vla/docs/manuals/propvla>
 - VLBA – <https://science.nrao.edu/facilities/vlba/docs/manuals/propvlba>
- TAC report
 - <https://science.nrao.edu/facilities/vla/observing/scheduling/tac-results>
- Guide to observing
 - VLA – <https://science.nrao.edu/facilities/vla/docs/manuals/obsguide>
 - VLBA – <http://www.aoc.nrao.edu/software/sched/index.html>
- Schedules web page (pressure plots and such)
 - <https://science.nrao.edu/observing/scheduling/schedules>
- Volunteer to serve on SRP
 - <https://www.aoc.nrao.edu/~mclausse/newex.html>



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